

REMARKS

Claims 1, 3-5, 7-14 and 19-21 are all the claims pending in the application. Claims 2, 6 and 15-18 have been canceled herein. Claim 1 has been amended to incorporate the subject matter of Claims 2 and 6 and additionally incorporate the recitation of “the polymer is produced by anionic polymerization using an alkaline metal compound and/or an alkaline earth metal compound as a polymerization initiator.” Support for the amendment can be found in the specification of the instant application at page 8, lines 21-23. Claims 3 and 4 have been amended to reflect the proper dependency in view of the canceled claims. Further, Claim 4 has been amended to more clearly define the subject matter of the present application. Thus, no new matter has been added herein.

Response to the Objection of the Specification

Referring to page 2 of the Office Action, the Abstract stands objected to for allegedly containing informalities. The Abstract has been amended herein. Applicants submit that it complies with USPTO requirements and request that the objection be withdrawn.

Response to Claim Rejections under 35 U.S.C. § 112

Referring to page 3 of the Office Action, Claims 1-14 and 19-21 stand rejected under 35 U.S.C. § 112, second paragraph, as the phrase “an organometal **type**” is said to be unclear. As discussed above, Claims 2 and 6 have been canceled herein. Thus, the rejection is moot with respect to Claims 2 and 6. Regarding Claims 1, 3-5, 7-4 and 19-21, without acquiescing in the rejection, the word “type” has been deleted for clarification purposes. Applicants submit that

Claims 1, 3-5, 7-14 and 19-21 comply with 35 U.S.C. § 112, second paragraph. Accordingly, withdrawal of the rejection is respectfully requested.

Claim 4 has been rejected under 35 U.S.C. § 112, second paragraph, as the phrase “the other monomer described above” is said to lack antecedent basis. To better reflect the subject matter of the present invention, Claim 4 has been amended to recite, “wherein the at least one additional monomer is an aromatic vinyl compound.” Applicants submit that Claim 4 is proper under 35 U.S.C. § 112, second paragraph. Thus, withdrawal of this rejection is respectfully requested.

Claim 16 has been rejected under 35 U.S.C. § 112, second paragraph, as the phrase “Formulas (I), (II) and (III) each described above” is said to lack antecedent basis. Claim 16 has been canceled herein. Thus, this rejection is moot.

Claim 18 has been rejected as the phrases “Formulas (IV) or (V)” and “Formulas (VI)” are said to lack antecedent basis. Claim 18 has been canceled herein. Accordingly, the rejection is moot.

Response to Provisional Obviousness-Type Double Patenting Rejection

Referring to page 4 of the Office Action, Claims 1, 5 and 7-9 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over Claims 10-12 of copending Application Serial No. 10/497,462 (“Application ‘462”). In this regard, the Examiner states that although the claims are not identical, they are not patentably distinct from each other because Claims 10-12 of Application ‘462 are directed to

processes for producing modified polymers which allegedly read on the processes set forth in Claims 1, 5 and 7-9 of the present application.

At the present time, Applicants respectfully defer their response to the provisional obviousness-type patenting rejection.

Response to Claim Rejections Under 35 U.S.C. § 102

Referring to page 5 of the Office Action, Claims 12 and 14-18 have been rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 6,274,688 to Nakagawa ("Nakagawa"). Claims 15-18 have been canceled herein. Thus, the rejection regarding Claims 15-18 is moot. Applicants respectfully traverse the rejection of Claims 12 and 14 for the following reasons.

Claim 12 depends from Claim 1 and is directed to a modified polymer obtained by the production process as described in claim 1. Claim 14 indirectly depends from claim 1, and is directed to a rubber composition comprising the modified polymer as described in claim 12 or 13.

As recited in Claims 12 and 14, the polymers of the present invention are produced by anionic polymerization using an alkaline metal compound and/or an alkaline earth metal compound as a polymerization initiator and obtained by homopolymerizing a conjugated diene compound or copolymerizing a conjugated diene compound with at least one additional monomer. However, Nakagawa does not disclose anionic polymerization, but rather, discloses that the acrylate polymers are produced by radical polymerization.

Further, Claims 12 and 14 require a condensation accelerator, which is not taught by Nakagawa. In this regard, Nakagawa discloses tin compounds such as dibutyltin diacetyloetionate and dibutyltin dimethoxide, which are curing catalysts, not condensation accelerators, for dried and solid formed polymers and are used in a dry mixing stage.

Moreover, Claims 12 and 14 recite conjugated diene polymers, which are different from the vinyl polymers taught by Nakagawa. Further, as required by Claims 12 and 14 of the present invention, in the process of this invention, condensation accelerators are used for accelerating the condensation of the two hydrocarbyloxysilane compound residues introduced into the active site of the polymer, and the condensation of the hydrocarbyloxysilane compound residue introduced into the active site of the polymer with the unreacted hydrocarbyloxysilane compound as the condensation accelerators are added in the reaction system in the middle of the above reaction and/or after completion thereof.

As Nakagawa fails to teach the process of anionic polymerization, a condensation accelerator, and conjugated diene polymers, Nakagawa fails to anticipate the Claims 12 and 14. Accordingly, the withdrawal of the rejection over Nakagawa is respectfully requested.

Claims 1-12 and 14-18 have been rejected under 35 U.S.C. § 102(b) as allegedly anticipated by JP 56-104906 ("JP 906"). Claims 2, 6 and 15-18 have been canceled herein; thus, the rejection is moot. Regarding the rejection of Claims 1, 3-5, 7-12 and 14, Applicants traverse for the following reasons.

Claim 1 requires a condensation accelerator be incorporated into the modification reaction system. However, JP 906 does not teach this element, that a condensation accelerator be introduced into the modification reaction system.

Claim 1 also recites a hydrocarbyloxysilane compound. However, JP 906 fails to teach such a compound. Rather, JP 906 discloses a silane compound of formula: $\text{SiX}_n\text{Y}_m\text{R}_{4-n-m}$, wherein X is a halogen atom, Y is a hydrolyzable group except for a halogen atom, R is alkyl, aryl, vinyl or alkyl halide group, n is 0 or 1, m is 1 to 4 and n+m is 2 or more. The silane compound formula disclosed in JP 906 does not teach the hydrocarbyloxysilane compound required in Claim 1.

In addition, the polymers obtained by the process of JP 906 have very high molecular weights compared to the polymers obtained by the methods of this invention.

Because JP 906 fails to teach the elements of a condensation accelerator in the modification system, and fails to teach a hydrocarbyloxysilane compound, as recited in Claim 1 of the present invention, JP 906 fails to anticipate Claim 1. For the same reasons JP 906 fails to anticipate independent Claim 1, JP 906 fails to anticipate dependent Claims 3-5, 7-12 and 14.

Referring to pages 6-7 of the Office Action, Claims 12 and 14-18 have been rejected under 35 U.S.C. § 102(b) as allegedly anticipated by JP 2000-086998 ("JP 998"). Claims 15-18 have been canceled herein. Thus, the rejection with respect to Claims 15-18 is moot. Applicants respectfully traverse the rejection of Claims 12 and 14 for the following reasons.

JP 998 is directed to a reactive hot melt adhesive having excellent thermal stability, especially excellent viscosity stability, when heated, capable of being set to an arbitrary reaction rate, capable of thermally actively adhering at low temperature, and having good heat resistance by using a vinylic polymer having specific crosslinking groups as a main component. This reactive hot melt adhesive contains a vinylic polymer having a crosslinking silyl group of the

formula: $[\text{Si}(\text{R}^1)_{2-b}(\text{Y})_b\text{O}]_m-\text{Si}(\text{R}^2)_{3-a}(\text{Y})_a$ [R^1 , R^2 are each a 1-20C alkyl, a 6-20C aryl or the like; Y is a hydroxyl group or a hydrolyzable group; (a) is 0-3; (b) is 0-2; (m) is 0-19, provided that (a)+(m)(b)≥1] as a main component. The vinylic polymer is preferably a (meth) acrylic polymer obtained using a (meth)acrylic monomer as a monomer constituting the main chain in an amount of ≥40 wt%. The vinylic polymer is preferably obtained, for example, by reacting an alkenyl-containing compound with a vinylic polymer obtained by a living radical polymerization method and subsequently reacting the obtained terminal alkenyl-containing vinylic polymer with a hydrosilane compound having the above crosslinking group.

As discussed above, Claims 12 and 14 recite anionic polymerization and a hydrocarbyloxysilane compound. JP 988 fails to teach these two elements, as the formula described therein does not teach a hydrocarbyloxysilane compound, and the vinylic polymer is obtained by a living radical polymerization method, not the anionic polymerization method, recited in Claims 12 and 14.

Moreover, JP 998 teaches vinylic polymers, which are the same as vinyl polymers. However, as discussed above, Claims 12 and 14 require a conjugated diene polymer, which is different from a vinylic (vinyl) polymer, and is not disclosed by JP 998.

Accordingly, as JP 998 fails to teach the elements of anionic polymerization, a hydrocarbyloxysilane compound, and a conjugated diene polymer, as recited in Claims 12 and 14 of the present invention, JP 998 fails to anticipate these claims. Thus, Applicants respectfully request withdrawal of this rejection.

Response to Claim Rejections Under 35 U.S.C. §103

a) Rejection of Claims 13, 14, 19-21

Referring to pages 7-8 of the Office Action, Claims 13, 14, 19 and 20 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Nakagawa. Furthermore, Claims 13, 14 and 19-21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 906.

Applicants respectfully traverse for the following reasons.

Applicants submit that as discussed above, Nakagawa and JP 906 fail to teach a condensation accelerator in the modification system, and fail to teach a hydrocarbyloxysilane compound, as required by Claims 13 and 14. Because these elements are not taught or suggested by either Nakagawa or JP 906, Claims 13 and 14 are not rendered obvious over Nakagawa or JP 906. Thus, withdrawal of this rejection is respectfully requested.

In addition, Claims 13, 14, 19 and 20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 998.

As discussed above, JP 998 fails to teach the elements of anionic polymerization, a hydrocarbyloxysilane compound, and a conjugated diene polymer, as recited in Claims 13, 14, 19 and 20. Because these elements are not taught or suggested by JP 998, Claims 13, 14, 19 and 20 are not rendered obvious over JP 998. Thus, Applicants respectfully request this rejection be withdrawn.

b) Rejection of Claims 1-21

Referring to pages 9-18 of the Office Action, Claims 1-21 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over EP 067 468 (U.S. equivalent: U.S. Patent No.

4,379,891) to Haynes ("Haynes"), WO 01/34658 (U.S. equivalent: U.S. Patent No. 6,992,147) to Ozawa ("Ozawa"), U.S. Patent No. 6,228,908 to Takeishi ("Takeishi 908"), U.S. Patent No. 6,573,412 to Hogan ("Hogan"), U.S. Patent No. 6,369,167 to Morita ("Morita"), and U.S. Patent No. 6,008,295 to Takeichi 295 ("Takeichi 295"), in view of U.S. Patent No. 6,191,247 to Ishikawa ("Ishikawa"). As discussed above, Claims 2, 6 and 15-18 have been canceled herein; thus, the rejection is moot. Regarding the rejection of Claims 1, 3-5, 7-12, 14 and 19-21, Applicants traverse for the following reasons.

Applicants respectfully traverse for the following reasons.

Specifically, the Examiner acknowledges Haynes, Ozawa, Takeishi 908, Hogan, Morita, and Takeichi 295 are silent on the specific use of a condensation accelerator (*see* Office Action at pages 10, 12, 14, 15, 16, and 17, respectively). However, the Examiner asserts that Ishikawa teaches the use of a tin or titanium condensation accelerator to facilitate the reaction between a hydrocarbyloxysilane compound and the silanol groups on the silica surface (*referring to* col. 12, lines 13-24), therefore, it would have been obvious to one skilled in the art to incorporate the condensation accelerator described in Ishikawa into the respective composition taught by one of the six above cited references.

Ishikawa discloses a silanol condensation catalyst which is blended into the rubber composition in which silica and a silane coupling agent and/or a polysiloxane containing alkoxysilyl groups are blended. This silanol condensation catalyst is blended in a dry mixing stage for the rubber composition, however, it is not added to the reaction system in the middle of the above reaction and/or after completion thereof.

As discussed above, Claim 1 of the present invention requires that a condensation accelerator is added in the middle of the reaction and/or after the completion thereof. The silanol condensation catalyst is not the same as the condensation accelerator recited in Claim 1. Furthermore, it is not added in the middle of the reaction and/or after the completion thereof, as required by Claim 1, but rather, it is blended in the dry mixing stage.

Thus, as Ishikawa fails to teach these elements of Claim 1, even if Ishikawa is combined with Haynes, Ozawa, Takeishi 908, Hogan, Morita and/or "Takeichi 295", the present invention is not taught or suggested. Dependent Claims 3-5, 7-12, 14 and 19-21, are not unpatentable for the same reasons as independent Claim 1 is not unpatentable over the prior art. In light of the above, withdrawal of the rejection is respectfully requested.

CONCLUSION

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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